

Measurements of a precise pressure in the C0002 borehole observatory using a mobile pressure gauge

MACHIDA, Yuya^{1*} ; ARAKI, Eiichiro¹ ; NISHIDA, Shuhei¹ ; KIMURA, Toshinori¹ ; MATSUMOTO, Hiroyuki¹

¹JAMSTEC

In the Nankai Trough region, several large interplate earthquakes with magnitudes of 8 have occurred repeatedly due to a subduction of the Philippine Sea Plate beneath the Eurasian Plate at a rate of 4-6 cm/year. In this area, we deployed a long-term borehole monitoring system (LTBMS) with pressure gauges (Paro-scientific Inc.8b7000-2 and 8b7000-1) into the C0002 boreholes during the IODP expedition 332 in 2010 to understand a seismogenic process of large interplate earthquakes. In the C0002 boreholes, seafloor pressure measurements are continuously conducted since the deployment. The precise pressure measurement such as the detection of long-term crustal deformation is important in order to obtain geophysical knowledge associated with the occurrence of large earthquakes. However, pressure measurements contain instrumental drifts in the sensors in addition to the pressure changes associated with a crustal deformations. Therefore a correction of the instrumental drift is necessary to estimate precise measurements of the crustal deformation. We developed a mobile pressure gauges equipped with pressure holding system for the correction. The mobile pressure gauge has a crystal water pressure meter (Paroscientific Inc. 410K) as a pressure sensor and is equipped with a pressure holding function due to a temperature control using a heater. Also, an electric valve control was adopted. These systems decrease a pressure variation throughout an observation. To estimate an accuracy of the pressure gauge, we measured a repeatability and hysteresis of the sensor. The repeatability of the sensor equipped with a pressure holding system is 1.3 hPa, while a repeatability of the sensors without a pressure holding system is 8.93. This indicates that the pressure holding system improves the accuracy of the sensors. In this March, a calibration of the C0002 pressure gauges is performed in the KY15-05 by R/V Kaiyo (2015.3.9~3.29). In this presentation, we show preliminary results of the cruise.